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| 10/599,186 | 09/22/2006 | Gang Wu | CN 040011 | 5615 |

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| EXAMINER | |
|---|---|
| ALPHONSE, FRITZ | |

| ART UNIT | PAPER NUMBER |
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| 2112 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/599,186 | WU ET AL. | |
| | Examiner | Art Unit | |
| | FRITZ ALPHONSE | 2112 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *22 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 June 2008* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/02/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

1. This Office Action is in regard to the Preliminary Amendment filed on 9/22/2006. Claims 1-27 were presented for examination.

### *Priority*

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Information Disclosure Statement*

3. The Information Disclosure Statement (IDS) submitted on 3/02/2007 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner.

### *Oath/Declaration*

4. The Oath/Declaration filed on (ABC) is accepted.

### *Drawings*

5. The drawings filed on 6/12/2008 are objected because:

Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

6. The abstract of the disclosure does not commence on a separate sheet in accordance with 37 CFR 1.52(b)(4). A new abstract of the disclosure is required and must be presented on a separate sheet, apart from any other text.

***Claim Objections***

7. Claims 3, 9 are objected to because of the following informalities: the word "braches" in line 5 of claim 3, line 4 of claim 9, should be ---branches---. Appropriate correction is required.

8. Claims 6, 11, 12 and 15 are objected to because of the following informalities: the abbreviation "AWGN" recited in claims 6 and 12, "QPSK" recited in claims 11 and 15, are undefined in the claims (the first time "AWGN" or "QPSK" is used, the actual language that defines the abbreviation should be spelled out). Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 3 recites the limitation "maximize **the sum of Euclidean distance** between branches of a predefined number along **the shortest error event path**..." in lines 2-4. There is insufficient antecedent basis for these limitations in the claim.

Claims 4-7 depend from claim 3 and inherently include limitations therein and therefore are rejected as well.

Claim 9 recites the limitation "**the shortest error event path** and corresponding braches of **the predefined number**..." in lines 3-5. There is insufficient antecedent basis for these limitations in the claim.

Claim 10 recites the limitation "**Said branches of the predefined number**..." in lines 2. There is insufficient antecedent basis for these limitations in the claim.

Claims 11-13 depend from claim 10 and inherently include limitations therein and therefore are rejected as well.

Claim 14 recites the limitation "along **the shortest error event path**..." in lines 7-18. There is insufficient antecedent basis for these limitations in the claim.

Claims 15-16 depend from claim 14 and inherently include limitations therein and therefore are rejected as well.

Claim 17 recites the limitation "maximize **the sum of Euclidean distance** between each branch along **the shortest error event path**..." in lines 8-10. There is insufficient antecedent basis for these limitations in the claim.

Claims 18-19 depend from claim 17 and inherently include limitations therein and therefore are rejected as well.

Claims 20 and 24 recite the limitation "maximize **the sum of Euclidean distance** between branches of a predefined number along **the shortest error event path**..." in lines 6-8. There is insufficient antecedent basis for these limitations in the claim.

Claims 21-23 and 25-27 depend from claim 20 or 24 and inherently include limitations therein and therefore are rejected as well.

***Claim Rejections - 35 USC § 101***

10. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-7, 8-13 are rejected under 35 U.S.C. 101 as being directed to method steps which can be practiced mentally in conjunction with pen and paper, therefore they are directed to non-statutory subject matter.

Specifically, as to claim 1, it is uncertain what performs each of the claimed method steps. Moreover, each of the claimed steps, inter alia, "generating convolutional code according to a predefined criteria and with reference to encoder predefined convolutional encoding rate and constraint length; processing data to be transmitted by using the convolutional code so that the coded data are suitable for propagation in multipath fading channel with Rayleigh fading." can be practiced mentally in conjunction with pen and paper. The claimed steps do not define a machine or computer implemented process (See MPEP § 2106). Therefore, the claimed invention is directed to non-statutory subject matter.

In addition, as to claim 8, it is uncertain what performs each of the claimed method steps. Moreover, each of the claimed steps, inter alia, "receiving data processed with convolutional code generated according to a predefined criteria via multipath fading channel; decoding the received data by using convolutional decode corresponding to the convolutional code, so that the decoded data can be gotten rid of Rayleigh fading during propagation via the multipath fading channel." can be practiced mentally in conjunction with pen and paper. The claimed steps do not

define a machine or computer implemented process (See MPEP § 2106). Therefore, the claimed invention is directed to non-statutory subject matter.

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 1, 2, 8, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mauer (U.S. Pat. No. 7,260,154) in view of Berthet (U.S. Pat. No. 7,170,948).

As to claim 1, Mauer discloses an encoding method, comprising: generating convolutional code according to a predefined criteria (col. 3, lines 10-19, where Mauer teaches convolutional encoder 111 performs the process of adding redundant information known as channel coding) and with reference to encoder predefined convolutional encoding rate and constraint length (col. 3, lines 19-30). According to Mauer (col. 3, lines 10-16) processing data is transmitted by using the convolutional code.

Mauer does not explicitly disclose that the coded data are suitable for propagation in multipath fading channel with Rayleigh fading. However the limitation is obvious and well known in the art, as evidenced by Berthet (col. 4, lines 9-18, where Berthet teaches QPSK modulations coded by a convolutional code of rate 1/2 in Multipath Rayleigh Fading have proved to be very efficient).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to combine Mauer's constraint length Viterbi Decoder with the coding/decoding

digital data system, as disclosed by Berthet. Doing so would prove to be very efficient within a framework of numerous intersymbol interference environments usually provided from Multipath Rayleigh Fading.

As to claim 2, Mauer discloses a method including: setting the convolutional encoding rate and constraint length according to a specification in a communication protocol (col. 3, lines 10-23, where Mauer teaches the data transmitter 110 including a convolutional encoder that can be characterized by its rate).

As to claim 8, Mauer discloses an encoding convolutional decoding method, comprising: receiving data processed with convolutional code generated according to a predefined criteria (col. 3, lines 31-45, where Mauer teaches Viterbi decoder 121 of receiver 120 supports decoding convolutional codes having a maximum constraint length); and, decoding the received data by using convolutional decode corresponding to the convolutional code (according to Mauer, the data transmitter (110) and receiver (120) can be configured to decode data.

Mauer does not explicitly disclose that the decoded data can be gotten rid of Rayleigh fading during propagation via the multipath fading channel. However, this is very obvious, as disclosed by Berthet (col. 4, lines 9-14, where Berthet teaches QPSK teaches Rayleigh fading demonstrates numerous intersymbol interference environments).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to improve upon the iterative coding/decoding digital data system, as disclosed by Berthet. Doing so would prove to be very efficient within a framework of numerous intersymbol interference environments usually provided from Multipath Rayleigh Fading.

As to claim 10, the dependent claim 10 included in the statement of rejection but not

specifically addressed in the body of the rejection have inherited the deficiencies of the parent claim 8 and have not resolved the deficiencies. Therefore, it is rejected based on the same rationale as applied to the parent claim 8 above.

***Allowable Subject Matter***

13. Claims 14, 17, 20 and 24 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Claim 14 contains allowable subject matter because none of the cited references either singular or in combination discloses the limitations "wherein the convolutional code is generated according to a criteria of maximizing sum of Euclidean distance between each branch along the shortest error event path and each corresponding branch along a correct decoding path, and the shortest error event path is a decoding path having the minimum branches of non-zero Euclidean distance compared with the correct decoding path."

Claim 17 contains allowable subject matter because none of the cited references either singular or in combination discloses the limitations "the convolutional decode corresponds to the convolutional code and the convolutional code is generated according to a criteria of maximizing the sum of Euclidean distance between each branch along the shortest error event path and each corresponding branch along a correct decoding path, and the shortest error event path is a decoding path having the minimum branches of non-zero Euclidean distance compared with the correct decoding path."

Claim 20 contains allowable subject matter because none of the cited references either singular or in combination discloses the limitations "wherein the convolutional code is generated

according to a criteria of maximizing the sum of Euclidean distance between each branch along the shortest error event path and each corresponding branch along a correct decoding path, wherein the shortest error event path is a decoding path having the minimum branches of non-zero Euclidean distance compared with the correct decoding path; a transmitting unit, for transmitting the coded data."

Claim 24 contains allowable subject matter because none of the cited references either singular or in combination discloses the limitations "wherein the convolutional code is generated according to a criteria of maximizing the sum of Euclidean distance between each branch along the shortest error event path and each corresponding branch along a correct decoding path, and the shortest error event path is a decoding path having the minimum branches of non-zero Euclidean distance compared with the correct decoding path; a transmitting unit, for transmitting the coded data."

14. Claims 3, 9, 11 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claim 3, 9 contains allowable subject matter because none of the cited references either singular or in combination discloses the limitations "wherein said predefined criteria is to maximize the sum of Euclidean distance between branches of a predefined number along the shortest error event path and the corresponding branches of the predefined number along a correct decoding path, and the shortest error event path is a decoding path having the minimum branches of non-zero Euclidean distance compared with the correct decoding path."

Claim 11 contains allowable subject matter because none of the cited references either singular or in combination discloses the limitation "wherein said sum of Euclidean distance is statistical sum of Euclidean distance when said received data adopt QPSK modulation scheme."

Claims 4-7, 12-13, 15-16, 18-19, 21-23 and 25-27 would be allowed by virtue of dependency.

***Conclusion***

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fritz Alphonse, whose telephone number is (571) 272-3813. The examiner can normally be reached on M-F, 8:30-6:00, Alt. Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman, can be reached at (571) 272-3644.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-3824

Information regarding the status of an application may also be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Fritz Alphonse/

Examiner, Art Unit 2112

March 30, 2009